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NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

THESIS

INTEGRATED CONCEPT TEAM UTILIZATION IN THE REQUIREMENTS DETERMINATION PROCESS

by

Jeffery C. Patten

December 1996

Thesis Advisor: David F. Matthews

19970728 117

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DTIC QUALITY INSPECTED 4

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE December 1996	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE: INTEGRATED CONCEPT TEAM UTILIZATION IN THE REQUIREMENTS DETERMINATION PROCESS

5. FUNDING NUMBERS

6. AUTHOR(S) Patten, Jeffery C.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE:

13 . ABSTRACT*(maximum 200 words*

The Army has developed a new requirements determination process aimed at providing decision-makers with better cost and technological feasibility information. The goals are to cut acquisition cycle-time and costs. The Army Training and Doctrine Command (TRADOC) will be responsible for all requirements decisions under the new system. The Army recognizes that requirements are produced from a variety of sources – battle labs, field commanders, Force XXI joint ventures, TRADOC schools, and other major Army commands. TRADOC, through its schools, is the new guiding force for the process. The school commandants will define, document, and defend doctrine, training, leadership development, organization, material development, and soldier requirements (DTLOMS). The user, requirements, and acquisition communities will have representatives on newly-created integrated concept teams (ICTs). Industry, academia, and relevant Pentagon organizations will also have members on the teams. ICTs will guide the requirements development process and complement the integrated product team (IPT) methodology already used by material developers. Establishing ICTs early in concept development enables the teams to transition to IPTs when a material requirement is approved at a Milestone I decision. One of the key components of the ICT process is considering Cost as an Independent Variable (CAIV) to weigh capabilities versus cost tradeoffs.

14. SUBJECT TERMS Integrated Concept Teams (ICT), Requirements Determination, Directorate of Combat Developments, TRADOC, DTLOMS, ICT,

15. NUMBER OF PAGES 76

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

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INTEGRATED CONCEPT TEAM UTILIZATION IN THE REQUIREMENTS DETERMINATION PROCESS

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MASTER OF SCIENCE IN MANAGEMENT

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ABSTRACT

The Army has developed a new requirements determination process aimed at providing decision-makers with better cost and technological feasibility information. The goals are to cut acquisition cycle-time and costs. The Army Training and Doctrine Command (TRADOC) will be responsible for all requirements decisions under the new system. The Army recognizes that requirements are produced from a variety of sources – battle labs, field commanders, Force XXI joint ventures, TRADOC schools, and other major Army commands. TRADOC, through its schools, is the new guiding force for the process. The school commandants will define, document, and defend doctrine, training, leadership development, organization, material development, and soldier requirements (DTLOMS). The user, requirements, and acquisition communities will have representatives on newly-created integrated concept teams (ICTs). Industry, academia, and relevant Pentagon organizations will also have members on the teams. ICTs will guide the requirements development process and complement the integrated product team (IPT) methodology already used by material developers. Establishing ICTs early in concept development enables the teams to transition to IPTs when a material requirement is approved at a Milestone I decision.

TABLE OF CONTENTS

I. INTRODUCTION

A. PURPOSE

The purpose of this research paper is to both study how Integrated Concept Teams (ICTs) can assist combat developers in the requirements determination process, and to present lessons learned from observations and interaction with existing ICTs. This is accomplished through the use of research and a case study of the United States Army Air Defense School's (USAADASCH) Weapons Requirements branch of the Directorate of Combat Developments (DCD). The ICT process will be examined with much attention to the organization, development, training, and interaction of the members within the ICT. The recommendations of this thesis are designed to assist future members of ICTs at the Combat Developments Organization level.

B. BACKGROUND

The process that the Army uses to determine and document warfighting requirements for the operational forces of the future is in a state of rapid transition. Changing strategic tempo; the need for new tactical, operational, and strategic capabilities; downsizing the Army; and severe fiscal constraints, are but a few of the changes that have influenced the way we determine requirements. In an attempt to keep pace with these changes and acquisition reform, Army Training and Doctrine Command (TRADOC) has been given the mission by the Chief of Staff of the U.S. Army to bring discipline to the Requirements Determination Process and become the Army's "gatekeeper" for all requirements. All of TRADOC's requirements regulations, policies, and procedures are in a transitional state and are being updated. Two major tenets of the new acquisition principles are teaming and

empowerment. To incorporate these principles in the Requirements Determination Process, TRADOC has recommended that ICTs be used to "brainstorm" concepts from both visionary and practical perspectives.

C. RESEARCH QUESTIONS

1. Primary Research Question

How should Integrated Concept Teams be best utilized in the Requirements Determination Process?

2. Secondary Research Questions

a. What is the current ICT concept adopted by the Army Training and Doctrine Command (TRADOC) and how does it impact the Requirements Determination Process?

b. Who are the key members of the ICT process and what will their roles be in the ICT?

c. How should the Combat Developments Organization of the U.S. Army Air Defense School best organize to facilitate implementing the ICT concept in the Requirements Determination Process?

D. SCOPE

This research will focus on ICT organization, development, and management in the TRADOC Requirements Determination Process. I will analyze both the team building process and how the process is applied at the Directorate of Combat Developments (DCD) level. My analysis will focus on how to organize the DCD to make the best use of scarce personnel and monetary resources in implementing the new ICT process.

E. METHODOLOGY

The first objective of this research paper is to provide an overview of the current Requirements Determination Process within the Department of the Army. This will be accomplished through a literature review of sources including, but not limited to, the following:

- Unclassified Department of Army publications
- Published academic research papers
- References, publications and electronic media available at the Naval Postgraduate School (NPS) library
- Internet websites and homepages (DoD, TRADOC, commercial, and academic)
- Interviews with personnel currently participating in ICTs
- The Defense Acquisition Deskbook compact disk

The next objective is to examine the ICT process by personal visitation to active ICTs in progress, and to interview key personnel in the process. The primary source for this information will be the Directorate of Combat Developments for the United States Air Defense School at Fort Bliss, Texas. Also, I will survey Directors of Combat Developments within the Army to extract their current philosophy and understanding of the ICT process.

F. ORGANIZATION

Chapter II (New Requirements Determination Process) provides an overview of the new Requirements Determination Process designed by TRADOC. Chapter II also provides information on how TRADOC intends to discipline the system, identify requirements faster,

improve products, and shorten acquisition time. The chapter concludes with a comparison of the new method of requirements determination versus the old process.

Chapter III (Integrated Concept Team Processes and Procedures) introduces the ICT concept and its relationship to determining requirements. The chapter will examine the similarities and differences between ICTs and Integrated Process Teams (IPTs). Additionally, this chapter will contain a detailed analysis of team-building and management of ICTs.

Chapter IV (Integrated Concept Team Utilization at the Directorate of Combat Developments, United States Army Air Defense School) will examine the methods that the U.S. Army Air Defense School has initiated to conduct their ICTs. This chapter will analyze the way they interpret TRADOC ICT processes and procedures and their methods of team building and integration. This research will be conducted by interviews and personal observation of ICTs in progress.

Chapter V (Analysis of ICT Implementation Challenges) will provide an analysis of the challenges that ICT leaders face when they initiate ICTs in their workplace. The focus of the chapter is on the issues that impact the development, acceptance, and utilization of ICTs at the Directorate of Combat Developments (DCD) level.

Chapter VI (Summary, Recommendations, and Conclusions) summarizes the findings of the research, answers the research questions, and presents recommendations for further research and study.

G. BENEFITS OF STUDY

The primary benefit of this study will be to disseminate lessons learned from the ICT process for Requirements Determination. Future members of these ICTs can benefit from the experiences of current Integrated Concept Teams and use these lessons to improve their ICTs. My thesis should benefit the Combats Developments organization as they transition to the new TRADOC method of determining requirements and conducting ICTs. My research should further assist all Combat Developments Organizations throughout TRADOC since there is currently no written material on how ICTs are conducted at their level.

II. NEW REQUIREMENTS DETERMINATION PROCESS

A. INTRODUCTION

Requirements Determination and the requirements development process are undergoing as many changes as the rest of the acquisition process. Although Requirements Determination is one of the first processes within the acquisition system, it has been one of the last areas to undergo acquisition reform. Within the past six months, the Army and the Department of Defense (DoD) have issued several new regulations and pamphlets describing what they call "A New Way of Doing Business" for determining requirements. The driving force behind the new Army documents are recent revisions to DoD Directive 5000.1 and DoD Regulation 5000.2-R. (DoD 5000) The DoD 5000 series documents emphasize teamwork, tailoring, and empowerment, and these principles are well integrated throughout several new Army and Training and Doctrine Command (TRADOC) documents.

One of these new Army Regulations (AR) that has come out in a draft format is the new AR 71-9 entitled Force Development Material Requirements. (AR 71-9) This document is a major revision of the previous AR 71-9 which was last updated in February 1987. Another important document is a Training and Doctrine Command (TRADOC) pamphlet that is entitled Requirements Determination. (RDBB) This TRADOC pamphlet is the third in a series of four pamphlets that TRADOC has issued in their "Black Book" format. The other three "Black Books" are: Strategic Plan 1995, Organizational Guide 1995, and Land Combat in the 21st Century. (SPBB, OGBB, LCBB) During the summer of 1996, TRADOC representatives went on a "road show" to all TRADOC installations in which they

provided an information brief about the "New Way of Doing Business." This road show highlighted all of the significant changes within the Requirements Determination process and the briefers highlighted the key areas of the Requirements Determination "Black Book" pamphlet. Elements of the "Black Book" and the new AR 71-9 will be discussed in the following paragraphs.

B. REQUIREMENTS DETERMINATION BACKGROUND

Army Regulation (AR) 71-9 (Draft) defines requirements determination as the process of identifying and analyzing warfighting required future operational capabilities (FOCs) for doctrine, training, leader development, organizations, training, and soldier development and executing solutions, within the context of the force development process. (Draft AR 71-9, 1996) This process is designed to be capability oriented, and not to be perceived as the support mechanism to acquire a particular piece of equipment.

Since the conclusion of the Cold War, the Army has become one of Force Projection and is based primarily in the United States. Warfighting requirements are becoming more "blurred" as we do not have a Soviet-style threat to focus on. Soldiers participate in numerous types of operations that were unthought of only a few years ago. Because of this, Requirements Determination must also move away from the old methods of doing business and move forward to comply with new acquisition philosophies.

The Chief of Staff of the U.S. Army, General Dennis J. Reimer, issued a letter to the Army in which he directed the TRADOC commander to chart the course for the Army to follow into the 21st century. He empowered the TRADOC commander to approve *all* Army warfighting requirements prior to their submission to the Department of the Army (DA).

(Reimer, 1996) In addition he directed all Army Commanders and the Army staff to support the TRADOC commander in this mission. If a need is identified that has any potential warfighting impact or utility, the procedures established by the TRADOC Commander must be followed to determine or document requirements. General Reimer's vision for the Army is to "*speed up* the requirements determination process while at the same time *improving its product.*" (Reimer, 1996)

The man responsible for implementing the Chief of Staff's vision is General William W. Hartzog, the TRADOC commander. General Hartzog in a letter to the Army contained in his "Black Book" states that, "Because of the hectic pace of change and limited resources, the process for determining requirements can neither be as linear as it once was, nor can it afford to become undisciplined." (Hartzog, 1996) He further adds, "No one wishes to throttle creativity or ingenuity; however, both integration and discipline must be achieved to move into the future with efficiency." (Hartzog, 1996)

C. THE "NEW WAY OF DOING BUSINESS"

The requirements determination process must look into the future at least 10 to 20 years out. The old method of determining requirements based on the difference between our capabilities and the Soviet Union's capabilities does not fit with the acquisition environment of today. The old process being threat-oriented had the following characteristics: stove-piped, paper based, sequential, high technical and cost risks, and very lengthy. The combat developers were isolated from the material developers and teaming between them was unusual.

Figure 2-1 depicts the old material Requirements Determination and acquisition process. (RDBB, 1996)

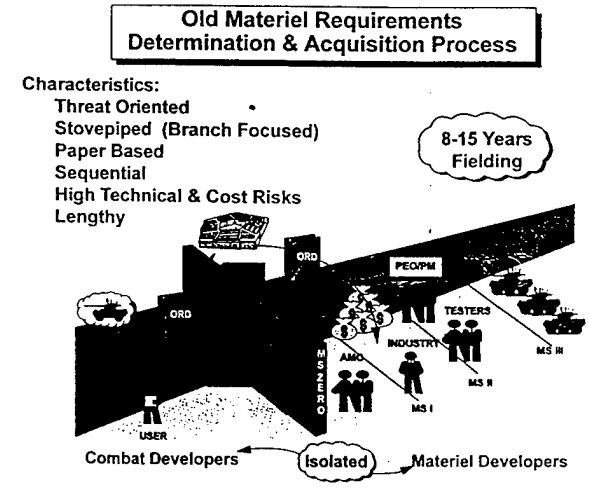

Figure 2-1, Old Material Requirements Determination & Acquisition Process (RDBB, 1996)

The new process for Requirements Determination looks at desired Joint and Army capabilities, which is a change from the old methods of reacting to deficiencies we had (perceived or real) against the Soviet threat.

Figure 2-2 depicts the new material Requirements Determination and Acquisition process. (RDBB, 1996)

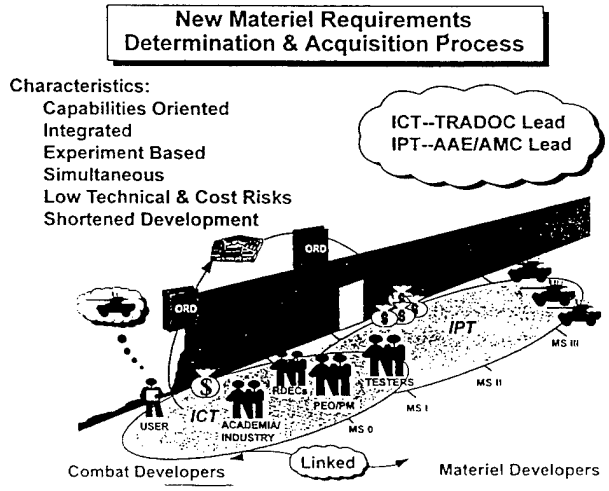

Figure 2-2, New Material Requirements Determination & Acquisition Process, (RDBB, 1996)

The TRADOC Requirements Determination black book describes the new process as beginning with a holistic future warfighting concept. This concept is formed from a wide variety of inputs, including the national security and military strategies, lessons learned from recent operational experiences, and future conflict scenarios. Future science and technology (S&T) possibilities influence the concept, but do not drive it. This overarching concept is the basis for all operation and functional concepts for the whole spectrum of Army operations and functions. The warfighting concepts are the Army's "blueprint" for determining our current doctrine, training, leader development, organization, organization, material, and soldier (DTLOMS) structure. The modification of these DTLOMS structure elements are what we call "requirements." Cost as an independent variable (CAIV) is a major consideration during requirements determination and in today's environment of reduced Research and Development budgets, is a major decision making factor. Solutions to future operational capabilities must include an affordable life cycle cost. Affordability must be addressed and no program should go forward unless the program is fully-funded. TRADOC emphasizes in bold print in their Requirements Determination black book that, "requirements not related to this blueprint are not and will not be resourced." (RDBB, 1996)

1. Integrated Concept Teams

Integrated Concept Teams (ICTs) are a new vehicle to "brainstorm" new concepts to determine if the concepts are practical and affordable. The ICTs are a variant of the Integrated Product Teams (IPTs) that material developers are now using. Members of an ICT include but are not limited to; users, academia, industry, Research Development and

Engineering Centers (RDECs), battle labs, and members of the testing community. TRADOC intends to use ICTs to shorten the requirements determination "event" and to provide it a better early focus. One advantage of the ICT is that members of the ICT in early concept development can transition to an IPT when a material requirement is approved. The ICT process and procedures will be discussed in detail in Chapter III (Integrated Concept Team Processes and Procedures).

2. Concept Development

The terms "vision," "concept," and "doctrine" are not synonymous, and are often misunderstood. The Army describes a "vision" as a rudimentary abstract description of a desired end state. A "concept" is a translation of a vision or visions into a more detailed, but still abstract description of some future activity or end state. "Doctrine" is described as a body of thoughts that are the fundamental principles by which military forces guide their actions in support of objectives. Visions and concepts generate questions about the future, while doctrine provides answers about today. (RDBB, 1996)

The way the process works in the Army is that first the TRADOC commander develops the Army's future warfighting vision. He develops this vision with input from national security and military strategy, and also from current and future scientific and technological opportunities. The TRADOC Deputy Chief of Staff for Combat Developments (DCDSD) heads up an Integrated Concept Team (ICT) which translates the TRADOC commander's warfighting vision into an overarching warfighting concept. This overarching warfighting concept becomes the primary reference for all other concept development activities. (RDBB, 1996)

More detailed operational and functional concepts are developed by TRADOC school commandants through their Directorates of Combat Developments (DCDs). The school commandants form their own ICTs to produce these concepts. All concepts developed by school commandants must be approved by the TRADOC commander.

Concept development usually leads to further scientific and technological research or experiments. During this concept development analysis, DTLOMS requirements and other interesting ideas emerge. These ideas and DTLOMS requirements must support future warfighting concepts.

3. Future Operational Capabilities (FOCs)

Future Operational Capabilities (FOCs) were previously known as Operational Capability Requirements (OCRs). TRADOC has issued a pamphlet 525-66 entitled Future Operational Capabilities. (TP 525-66) This pamphlet is the control mechanism for requirements determination activities. All FOCs in TRADOC Pam 525-66 are designed to articulate specific capabilities required to fulfill Battle Lab concepts. FOCs are intended to provide a warfighting focus for the Army's Science and Technology investments.

FOCs are employed to assess warfighting value of Science and Technology (S&T) endeavors and to translate concepts into discrete, statements of need. There is one set of FOCs written for each Battle Lab, and these encompass the battlefield dynamic for which the Battle Lab is responsible. TRADOC Pam 625-66 lists FOCs in a standard format with a number, title, description, and a reference. (TP 525-66) An example FOC from the Battle

Command Systems Battle Lab for System Interoperability reads as follows:

> **BC09: System Interoperability:** *To fulfill the vision articulated in TRADOC Pamphlet 525-5, Force XXI Operations and the Battle Command Concept, systems must be operable with other U.S. Army, sister-service, government and non-government agencies, and allied systems.* (TP 525-66, 1995)

After reading this FOC, one can see how the TRADOC commander's vision flows down until it becomes a concept within the Battle Command Battle Lab area of responsibility. The objective of this FOC is to focus the Battle Command Battle Lab toward capabilities which will provide the Army the ability to have total, uninterrupted, interoperable, communications between Government and non-Government agencies, and joint and combined forces throughout the battlespace from the National Command Authority to operator level.

4. Science and Technology Research

The Army Science and Technology (S&T) program is designed to develop innovative technological warfighting concepts. All sources of new technology such as Commercial Off-The-Shelf (COTS), and non-developmental items (NDI) as well as new-start programs are analyzed. These all assist in our goal of rapid requirements determination. For example, if a COTS or an NDI item produce a Future Operational Capability, then we save the expense and time spent for research that is required by a new-start. (RDBB, 1996)

Research into new possibilities is not unguided, but is focused by a series of reviews. Annually, the Army assesses all proposed S&T projects. From this assessment, a list of the top 200 Army S&T Objectives (STO) is generated. The Army Science and Technology Working group (ASTWG) approves each STO, and the approved STO is listed in the Army

Science and Technology Master Plan (ASTMP). The ASTMP provides the basis for Advance Technology Demonstrations which are analyzed to determine if any have military merit. (RDBB, 1996)

S&T research sometimes produces an item that is recognized as a defined requirement. These should be resourced and evaluated in warfighting experiments before a decision is made to document them as requirements.

5. Warfighting Experiments

Warfighting experiments are described as the "heart" of the requirements determination process. They are designed to provide Army leaders with future operational capability insights. Warfighting experiments are different from test and evaluation as they are designed to gain understanding about future warfighting, not just to measure an existing system, or new procedures.

Battle labs are responsible for planning and conducting warfighting experiments. The battle lab must first develop a hypothesis and then prepare detailed plans that describe objectives, measures of performance, measures of effectiveness, participants, milestones, data collection and resources. They are assisted by the TRADOC Analysis Center (TRAC) which leads the analysis of every experiment. Their analysis and recommendations form the basis for the final experimental report. The experimental report yields insights through which the battle labs can make recommendations to invest in the concept, discard the concept, or experiment further with the concept.

There are two main categories of warfighting experiments. They are concept experiments, and advanced warfighting experiments (AWE). Most of the experiments are

concept experiments. These pertain to individual operations or branches of the Army such as Air Defense, or Armor. (RDBB, 1996)

Larger experiments which focus on major increases to warfighting capabilities across multiple branches are part of the AWE program. AWE programs are sponsored by the TRADOC commander with the Chief of Staff, Army, approving and resourcing the experiment. Both types of experiments involve field soldiers and units in a field environment. As these experiments are expensive, attempts are being made to increase the amount of simulation involved. Interactive simulators and modeling are ways to reduce the cost and length of large experiments with actual soldiers.

Warfighting experiments are one of the best ways to show the Army future warfighting potential. They allow us to "maintain the edge" and conserve resources at the same time. (RDBB, 1996)

D. SUMMARY

Concept development, Science and Technology research, warfighting experiments and other issues provide insight and ways to achieve future operational capabilities. Considering cost as an independent variable, these insights must be analyzed by concept proponents to determine which are the most effective in both terms of cost and performance. The least costly and most rapid changes are considered first. If doctrinal changes can provide the desired operational capability, then these should be considered first as they are the least expensive. If doctrinal changes do not provide the operational capability, then we should analyze in order: training, leader development, organizational design, and finally material.

Material requirements are the most expensive to fulfill. They range from: modernization of the existing equipment, product improvements, replacement, or completely new systems.

The bottom line of the new requirements determination process is that it is designed to:

- Discipline the system
- Identify requirements faster
- Improve products
- Shorten acquisition time

These changes can best be explained by a quotation from the Army Chief of Staff Dennis Reimer in which he explains several key points.

> We must find smarter ways to do business, streamline our management processes, reduce overhead, leverage outside resources, and use what we have more efficiently in order to become more effective. (Reimer, 1996)

III. INTEGRATED CONCEPT TEAM PROCESSES AND PROCEDURES

A. INTRODUCTION

Chapter III will examine the current teaming environment within DoD and where the ICT process fits within this environment. Details will be provided on what an ICT is, how it is formed, and who the key members are. The chapter will examine the differences and similarities between ICTs and IPTs. Additionally, this chapter will contain a detailed analysis of team-building and management and leadership of ICTs. The final section will be a chapter summary.

B. TEAMING BACKGROUND WITHIN DOD

On 10 May 1995, Secretary of Defense William Perry issued a memorandum to the Service Secretaries requiring the use of Integrated Product Teams (IPTs) "throughout the acquisition process to the maximum extent practicable." (Perry, 1995) This memorandum describes the use of IPTs as "a management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing, and supportability processes," and notes that IPTs are "currently being used successfully by many industry and government program managers." (GMOIPT, 1996)

Shortly after the Perry memo on IPTs, Dr. Paul Kaminski, Under Secretary of Defense (Acquisition & Technology) (USD(A&T)) hosted a meeting with more than 400 senior members of the DoD acquisition community. The theme of the meeting was "Institutionalizing Integrated Product Teams in Defense Acquisition - DoD's Commitment

to Change." This meeting had two objectives:

- To ensure that these key leaders had a common understanding of what IPTs are, how they operate, and how the IPT process differs from the traditional process that DoD has used in the past to oversee and review acquisition programs.
- To ensure that there was a universal commitment by all functional disciplines to use IPTs. (IIDA, 1995)

The second bullet about *universal commitment* by all disciplines is a primary reason that the requirements community has chosen to use ICTs (as a variant of the IPT process) to explore and brainstorm new concepts. TRADOC has further displayed their willingness to follow Secretary Perry on the use of teaming, by integrating the use of ICTs into their new Requirements Determination process within six months of the Secretary's memo.

C. TEAMING

Before one can understand what an ICT is, one must first understand Integrated Product and Process Development (IPPD). Integrated Product and Process Development is a management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes. IPPD facilitates meeting cost and performance objectives from product *concept* through production, including field support. (Perry, 1995) Secretary Perry included some tenets of IPPD as an attachment to his memo. These tenets are as follows:

a. Customer Focus

The primary objective of IPPD is to satisfy the customer's needs better, faster,

and at less cost. The customer's needs should determine the nature of the product and its associated processes.

b. Concurrent Development of Products and Processes

Processes should be developed concurrently with the products which they support. It is critical that the processes used to manage, develop, manufacture, verify, test, deploy, operate, support, train personnel, and eventually dispose of the product, be considered during product development. Product and process design and performance should be kept in balance.

c. Early and Continuous Life-Cycle Planning

Planning for a product and its processes should begin early in the science and technology phase (especially advanced development) and extend throughout a product's life cycle. Early life cycle planning, which includes customers, functions and suppliers, lays a solid foundation for the various phases of a product and its processes. Key program events should be defined so that resources can be applied and the impact of resource constraints can be better understood and managed.

d. Maximize Flexibility for Optimization and Use of Contractor-Unique Approaches

Request for Proposals (RFPs) and contracts should provide maximum flexibility for optimization and use of contractor-unique processes and commercial specifications, standards, and practices.

e. Encourage Robust Design and Improved Process Capability

Encourage use of advanced design and manufacturing techniques that

promote achieving quality through careful design, products with little sensitivity to variations in the manufacturing process (robust design), and focus on process capability and continuous process improvement. Utilize such tools as "Six-Sigma" process control and lean/agile manufacturing concepts to advantage.

f. Event-Driven Scheduling

A scheduling framework should be established which relates program events to their associated accomplishments and accomplishment criteria. An event is considered complete only when the accomplishments associated with the event have been completed as measured by the accomplishment criteria. This event-driven scheduling reduces risk by ensuring that product and process maturity are incrementally demonstrated prior to beginning follow-on activities.

g. Multidisciplinary Teamwork

Multidisciplinary teamwork is essential to the integrated and concurrent development of product and its processes. The right people at the right place at the right time are required to make timely decisions. Team decisions should be based on the combined input of the entire team (e.g., engineering, manufacturing, test, logistics, financial management, contracting personnel) to include customers and suppliers. Each team member needs to understand their role and support the roles of the other members, as well as understand the constraints under which the other team members operate. Communication within teams and between teams should be open, with team success emphasized and rewarded.

h. Empowerment

Decisions should be driven to the lowest possible level commensurate with risk. Resources should be allocated at levels consistent with authority, responsibility, and the ability of the people. The team should be given the authority, responsibility, and resources to manage the product and its risk commensurate with the team's capabilities. The team should accept responsibility and be held accountable for the results of their effort.

i. Seamless Management Tools

A framework should be established which relates products and processes at all levels to demonstrate dependency and interrelationships. A single management system should be established that relates requirements, planning, resource allocation, execution, and program tracking over the product's life-cycle. This integrated approach helps ensure teams have all available information thereby enhancing team decision making at all levels. Capabilities should be provided to share technical and business information throughout the product life-cycle through the use of acquisition and support databases and software tools for accessing, exchanging, and viewing information.

j. Proactive Identification and Management of Risk

Critical cost, schedule, and technical parameters related to system characteristics should be identified from risk analyses and user requirements. Technical and business performance measurement plans, with appropriate metrics, should be developed and compared to best-in-class industry benchmarks to provide continuing verification of the degree of anticipated and actual achievement of technical and business parameters.

D. INTEGRATED CONCEPT TEAM FORMULATION

An Integrated Concept Team is formed when a concept is deemed worthy for further exploration by one of the TRADOC schools. Usually, the Commanding General, Deputy Commanding General, or Deputy Chief of Staff will initiate an ICT to explore a concept, determine possible future capabilities, or to determine requirements. The key to ICT formulation is simplicity and flexibility. An ICT may be chartered or informal. Most ICTs have a formal charter which establishes the purpose of the ICT, the scope of the ICT, and the objectives, organization, and responsibilities of the individual members. The charter will further set procedures and guidelines with topics such as agendas, meeting conduct, and how information is distributed. The charter of the ICT is a living document and is modified and improved on a routine basis as the ICT progresses.

The Commandant of the school, or other official who initiates an ICT, will usually designate a chairman or leader of the ICT. In most situations the Commandant will officially appoint a chairman of an ICT with an appointment letter. The ICT chairman, by means of this appointment, has the authority to do the following: assemble a team of subject matter experts, task work members to perform mission requirements, and resolve discrepancies among team members. The ICT chairman will, in the event of unresolved differences between team members and organizations, elevate unresolved issues to higher authorities, or all the way up the chain to the Commandant of the school.

E. KEY INTEGRATED CONCEPT TEAM MEMBERS

The key members of an ICT usually consist of, but are not limited to, a Chairman, a Team Leader, Principal Members, and Associate Members. Membership of the ICT will

be amended as necessary to support the objectives of the team. The Chairman, as explained in the previous section, can serve as the leader of the team, but usually delegates this role to a Team Leader.

F. LEADERSHIP OF INTEGRATED CONCEPT TEAMS

The leader of the ICT is usually selected by the chairman. Leaders are usually members of the chairman's organization that is responsible for the execution and hosting of the ICT. Most industry and Government teams use a single leader in their team, but the leadership role can shift as the team progresses. Some teams have co-leaders, with one clearly in charge in the event of non-agreement, and the other acting as a "deputy." Use of co-leaders can be a way to improve cooperation between two separate groups, such as between engineering and management. (GMOIPT, 1996) The leader of the ICT has many duties, but the principal duty is to serve as a functional supervisor with the responsibility of keeping the team focused in the direction that was mandated in the team's charter. Above all, team leaders must have a high level of communication skills. Team leaders must be able to articulate their vision and present the team's mission so that the goals and objectives of the ICT are clearly understood by all team members. In addition to their own participation in the team, team leaders must involve all members of the team in the process and facilitate their actions toward the team's objectives.

G. PRINCIPAL MEMBERS

Principal members of a typical ICT would include representatives from major Army commands (MACOMs) and staffs, appropriate DoD organizations, other Federal agencies, industry, and academia. These representatives bring a broad base of different perspectives

which allow the team to analyze concepts in a very diverse manner. Each principal member is a "specialist," and has a key role on the team as a subject matter expert. The two most important characteristics that principal members must have are the abilities to be cooperative, and to be empowered to make a decision or recommendation. Secretary Perry in an attachment to his May 1995 memo, said that the two most important characteristics of IPTs are:

1. Cooperation

Cooperation is essential. Teams must have full and open discussions with no secrets. All the facts need to be on the table for each team member to understand and assess. Each member brings a unique expertise to the team that needs to be recognized by all. Because of that expertise, each person's views are important in developing a successful program, and these views need to be heard. Full and open discussion does not mean that each view must be acted on by the team. The team is not searching for "lowest common denominator" consensus. There can be a disagreement on how to approach a particular issue, but that disagreement must be reasoned disagreement based on an alternative plan of action rather than on unyielding opposition. Issues that cannot be resolved by the team must be identified early so that resolution can be achieved as quickly as possible at the appropriate level. (Perry, 1995)

2. Empowerment

Empowerment of ICT team members is critical. The functional representatives assigned to the IPT at all levels must be empowered by their leadership to give good advice and counsel to the Program Manager. They must be able to speak for their superiors, the

"principals," in the decision making process. IPT members cannot be expected to have the breadth of knowledge and experience of their leadership in all cases. However, they are expected to be in frequent communication with their leadership, and thus ensure that their advice to the Program Manager is sound and will not be overturned later, barring unforeseen circumstances or new information. One of the key responsibilities of our leadership is to train and educate their subordinates so they will have the required knowledge and skills to represent their organization's leaders. IPT members are an extension of their organizations and their leadership; they must be able to speak credibly for those organizations and leaders.

ICT team members are expected to ensure that their leadership is in agreement with what the ICT is doing. When issues arise that exceed the limits of a team members' empowerment, the ICT leader must allow members adequate time to coordinate issues and positions with their principals. There should be no surprises when the principals are asked to coordinate or review a final draft document or decision. (AMC-P, 1996)

H. TEAM TRAINING AND TEAM-BUILDING

Often when multifunctional teams are formed, the people who are placed on those teams may not have been exposed to the people and disciplines represented. When this happens, the group will go through a phase where working relationships and leadership roles are established. The team leader must be familiar with group dynamics and teaming practices. Teaming/group dynamics/Integrated Process and Product Management (IPPM) training should be provided to all ICT members, so that the benefits of teaming can be realized. (AMC-P, 1996) The DoD Guide to Integrated Product and Process Development views team IPPD training in three parts: Program-specific, IPPD methodology, and team-

building. The program-specific training should assure that everyone has a common vision and understanding of the customer's requirements and the organization's purpose and products. Next would be an overview of IPPD methodology and an introduction to the tools and techniques used to implement this management philosophy. Finally, team-building exercises should be conducted to bring the organization together as a whole and to facilitate the cultural change. In addition, functional managers should ensure that representatives assigned to ICTs are adequately trained within their respective functional area. Training of functional representatives is necessary to ensure that the representatives stay current within their area and that they understand how their decisions within the ICT will be viewed by their managers.

What distinguishes IPPD training from education in general is not the underlying educational principles, but the content and relationship to specific needs, i.e., the desired future state. The underlying principles and philosophy are the same. IPPD training efforts should strive to:

- Provide specific information on approaches needed for implementation,
- Improve problem-solving and leadership skills,
- Instill a team and a product/process orientation, and
- Develop risk/assessment/intervention skills.

In conjuntion with IPPD training, additional training should be offered that builds upon the initial three-part training. This training should provide detailed guidance on the implementation of IPPD management philosophy as it pertains to a specific team. It should

focus on the roles and interrelationships between the various disciplines and between other teams, on the participation of core and adjunct members, and on bringing the group together as a team. This training should be repeated for any new team members and as a refresher for other team members as needed. Team-building is the process in which individuals learn to better understand themselves and others, and to develop positive working relationships which contribute toward the building of individual and team action plans. Teamwork in an ICT does not just happen. It depends on the communication and leadership skill of all team members, both leaders and principal members. By using the three-part process of program-specific training, IPPD training, and team-building, a team can become highly effective. Glenn Parker, in his book entitled Team Players and Teamwork: The New Competitive Business Strategy, lists 12 characteristics of an effective team. (Parker, 1992) These characteristics are:

- Clear Purpose: The vision, mission, goal, or task of the team has been defined and accepted by everyone. There is an action plan.
- Informality: A comfortable, relaxed atmosphere; little tension or boredom.
- Participation: Lots of discussion and participation in it.
- Listening: Members use effective listening techniques, such as questioning, paraphrasing, and summarizing.
- Civilized Disagreement: No signs of avoiding, smoothing over, or suppressing conflict.
- Consensus Decisions: For important decisions, the goal is substantial but not necessarily unanimous agreement through open discussion of everyone's ideas, avoidance of formal voting, or easy compromises.
- Open Communications: Team members feel free to express their feelings on the

tasks as well as on the groups' operation. There are few hidden agendas. Communication takes place outside of meetings.

- Clear Roles and Work Assignments: There are clear expectations about the roles played by each team member; work is fairly distributed.

- Shared Leadership: While the team has a formal leader, leadership functions shift from time to time depending on the circumstances, the needs of the group, and the skills of the members. The formal leader models the appropriate behavior.

- External Relations: The team builds credibility with other parts of the organization.

- Style Diversity: The team has a broad spectrum of team-player types including members who emphasize attention to task ("Contributor"), goal setting ("Collaborator"), focus on process ("Communicator"), and questions about how the team is functioning ("Challenger").

- Self-Assessment: Periodically, the team stops to examine how well it is functioning and what may be interfering with its effectiveness.

I. TEAM COMMUNICATION

Team communication is the greatest challenge in the administration of ICTs. All people interviewed about this issue expressed a desire to improve and speed up communication between team members. Co-location of the team results in the best exchange of information, but this can be impractical because ICTs are comprised of so many diverse members that frequently co-location is not possible. Because of the different locations of most members, they must be kept informed of team information through various information sharing tools. These tools include FAX machines, overnight mail delivery, increasingly effective tele-conferencing, secure electronic mail, voice mail, Electronic Data Exchange (EDE), File Transfer Program (FTP), and video recorders. The last six tools are particularly useful because they are paperless. (DoDG, 1996) The telephone is a powerful

tool also, both for individual calling and for conference calls. Conference calls are an excellent way to disseminate information to a small group, but control becomes difficult with larger groups.

There is no one best way to share information and communicate within the team. All methods and technologies that are available to disseminate information should be utilized. Jack Welch, the Chief Executive Officer of General Electric, emphasizes several key points with respect to information sharing.

> Access to pertinent information is essential to getting the job done. The right to know is basic. Moreover, it is better to err on the side of sharing too much information than risk leaving someone in the dark. Information is power, but it is pointless power if hoarded. (Welch, 1989)

J. SUMMARY

This chapter addressed the current teaming environment within the Department of Defense and how teaming is now integrated into concept development. IPPD tenets were discussed and these tenets were further examined in the sections on team formulation, training, and leadership. To be successful, members of ICTs must develop their interpersonal skills as well as retain their core expertise in their functional area. ICTs enhance communication across organizational boundaries, and generate better recommendations and decisions to the high-level requirements determination decision-makers.

The multidisciplinary approach to requirements determination by using ICTs is effective. Joined together in ICTs, the representatives of otherwise disparate organizations provide the Army an unprecedented means to "see" the future. The next chapter will explain

how the Directorate of Combat Developments (DCD) at the Air Defense Center uses these processes in their ICTs.

IV. INTEGRATED CONCEPT TEAMS AT THE DIRECTORATE OF COMBAT DEVELOPMENTS LEVEL

A. INTRODUCTION

Previous chapters of this thesis presented the new Requirements Determination and ICT processes and procedures. In this chapter I will present a review of how the Directorate of Combat Developments (DCD) at the United States Army Air Defense Center at Fort Bliss, Texas, applied these processes to their first ICT. Information for this review was obtained from personal interviews with ICT personnel, ICT documents, and the author's own observation of the ICT. Because the ICT process is so new, there are currently no ICTs which have run their course and made the transition into an IPT upon the approval of a material requirement at Milestone I. This chapter is intended to only represent the methods and processes that have been used up to this time by ICT personnel.

Following this review, there will be a listing of all of the other ICTs that are underway (as of September, 1996) within TRADOC organizations. This listing is intended to provide the reader with a feel for the diversity and potential for the application, of the ICT process.

B. INITIATION OF THE COMBINED ARMS DIRECTED-ENERGY WEAPON SYSTEM INTEGRATED CONCEPT TEAM

1. Background

The first ICT that the Air Defense Center's DCD initiated was called the Combined Arms Directed-Energy Weapon System (CADEWS) ICT. Several issues caused the DCD to choose to initiate this ICT. The first issue was that TRADOC assigned proponency for

conceptual development of the Tactical High Energy Laser (THEL), and the Aerostat, to the United States Army Air Defense Center in May 1996. At the same time, numerous DoD, Army, and TRADOC regulations were being revised and issued, which repeatedly mentioned the use of ICTs in the Combat Development process. The DoD Directive 5000.1 and Regulation 5000.2-R, issued in March 1996, stressed teamwork and empowerment as one of the major themes. Another document fielded in the spring 1996 time frame was the Army Regulation 71-9 (Draft), Force Development Material Requirements, which said:

> The Requirements Determination Process must not be constrained to near-term needs. Long-range planning looks ahead 10 to 20 years. As a result of the Army's future warfighting vision and the resulting overarching warfighting concept - - a holistic, macro-level description of the future Army - - created by the senior leadership, school commandants, using integrated concept teams (ICTs), will develop more detailed lower level concepts to support the Army's overarching warfighting concept. (FDMR, 1996)

The combination and timing of receiving proponency for THEL, AEROSTAT, and the new DoD philosophy on the use of teaming, caused the DCD to recommend forming the CADEWS ICT on June 24, 1996. Following this decision, initial contacts were made with the Space and Strategic Defense Command (SSDC), Army Research Labs (ARL), the Air Defense Lab (ADL), and other agencies. Additionally, the SSDC committed a four-month contractor effort to support the newly-forming CADEWS ICT. The support contractor was given a technical directive which described the work required to support the CADEWS ICT, and a description of the deliverables to the ICT. The description of the support contractor's sub-task is as follows:

> 1. Description of the Sub-task: In support of the USAADASCH's Combined Arms Weapons System (CADEWS) Integrated Concept Team (ICT), contractor is to conduct and provide a first order assessment of alternative

Directed-Energy (DE) technologies as to potential applicability to Air and Missile Defense in the 2015 +/- years time frame; provide a concept (or set of concepts) on "How to Fight" the alternative DE technologies; provide rationale to support CADEWS MNS and initiation of CADEWS ORD requirements definition. Contractor will effect frequent liaison with the ICT; provide technical administrative support for briefings, in-progress reviews and similar activities which relate to the work described above/herein. Estimated level of effort is eight man-months.

The description of deliverables that the support contractor was responsible for includes:

2. Description of Deliverables (form and schedule):

- Briefings and status reports to the ICT chairman/team leader as required.
- Catalog/Assessment report of DE technologies 60 days after receipt of technical directive.
- Concept/concepts on "How to Fight" DE alternatives 90 days after receipt of technical directive.
- Rationale report to support MNS and ORD requirements definition 120 days after receipt of technical directive.

As can be seen by the support contractor's technical directive, the support contractor has a key role as a member of the CADEWS ICT. The primary reason the support contractor has such a large role is because of the difficulty in acquiring information on a concept as new and technical as Directed-Energy.

2. Combined Arms Directed Energy Weapon System Charter

The next step in the formulation of the CADEWS ICT was to draft a charter which directed the specific requirements and responsibilities of the ICT. The ICT charter was broken down into seven sections. Section 1.0 (References) of the ICT charter was a list of references that included the new 5000 series policies and regulations, as well as the Draft AR 71-9, and the Requirements Determination Black Book. Section 2.0 (Purpose)

established the purpose of the ICT. This section reads as follows:

> This charter establishes the CADEWS ICT. In support of USAADASCH proponency, the task of this ICT is the development of a CADEWS Mission Need Statement (MNS), "How to Fight" Concept or Concepts, and an Operational Requirements Document (ORD).

Section 3.0 (Scope) gives a focus to the ICT and reads:

> The CADEWS ICT will initially assess alternative DE technologies as to potential applicability to Air and Missile Defense in the 2015 +/- years time frame; provide a concept (or set of concepts) on "How to Fight" the alternative DE technologies; provide a rationale to support CADEWS MNS and initiation of CADEWS ORD requirements definition. The ICT will then develop a viable MNS and proposed milestone schedule for the CADEWS program. Once the mission need and milestones have been addressed, the ICT will develop the
> actual requirements for the ORD.

Section 4.0 (Objectives), listed the specific objectives of the CADEWS ICT. The specific objectives of the CADEWS ICT are to:

a. Develop a CADEWS MNS.

b. Develop a CADEWS "How to Fight" concept(s).

c. Develop a proposed CADEWS program milestone schedule.

d. Develop a CADEWS ORD.

Section 5.0 (Organization) of the charter described the organization of the CADEWS ICT and the members. Section 6.0 (Responsibilities) described the responsibilities of each of the key members of the ICT, and listed a set of responsibilities for each member:

a. Active participation in the CADEWS ICT.

b. Attendance at CADEWS ICT meetings.

c. Preparation and presentation of assigned tasks (aka action items) for/to the CADEWS ICT.

d. Keeping their chain-of-command informed of the progress of the CADEWS ICT. Soliciting command support of CADEWS ICT products such as CADEWS MNS.

e. Representing their organization(s) and when/as required, stating official positions. [On behalf of their organization(s), members are empowered to exercise this authority.]

The final section, Section 7.0 (Procedures and Guidelines), defined the general and specific operational guidelines for the ICT which included calling meetings, developing agenda items, and conducting meetings.

The initial CADEWS charter was drafted during July 1996, and is intended to be reviewed at least annually. The charter is a "living" document and subject to change based on events that occur within the ICT.

3. Appointment of CADEWS ICT Chairman

Following receipt of a draft charter for the CADEWS ICT, the Commanding General of USAADASCH appointed the acting head of the Directorate Combat Developments as the Chairman of the CADEWS ICT. The appointment letter signed on August 1, 1996, gave the Chairman his mission and authority to lead the CADEWS ICT. The letter reads as follows: (CGLTR, 1996)

> The Integrated Concept Team will assess the alternative DE technologies as to potential applicability to Air and Missile Defense in the 2015 +/- time frame; provide a concept (or set of concepts) on "How to Fight" the alternative DE technologies; and provide rationale to support CADEWS MNS and initiation of CADEWS ORD requirements definition. The initial results of the ICT effort will be briefed to the U.S. Army Training and Doctrine Command and the Department of the Army during first quarter FY 97. Once the mission need has been approved, the ICT will develop the requirements for the Operational Requirements Document (ORD). This effort will include a trade-off analysis and development of a matrix summarizing the results. The matrix will be used to brief the ORD

requirements to decision-makers as part of the ORD approval process. The ICT will remain intact until the ORD approval process is completed.

The ICT Chairman, by means of this appointment, has the authority to do the following: assemble a team of subject matter experts, task work members to perform mission requirements, and resolve discrepancies among team members.

The ICT Chairman will, in the event of unresolved differences between team members and organizations, elevate unresolved issues to the Director, Combat Development for resolution. Unresolved issues at that level will be resolved by the Commander, U.S. Army Air Defense Artillery School (USAADASCH).

This appointment will remain in effect until released by responsibilities by the Commander, USAADASCH.

C. CONDUCT OF THE FIRST CADEWS ICT

The first CADEWS ICT was held at the DCD headquarters building on October 3, 1996. The ICT meeting was called to order by the Chairman of the ICT, who welcomed and introduced the attending members. The Chairman then explained the purpose of the CADEWS ICT and stressed the importance of the team's actions. Following his comments, the Chairman then introduced the Team Leader of the CADEWS ICT, who then took the lead role in the administration of the ICT.

The Team Leader briefed administrative notes to the team and a summary of the ICT actions to date. Following the administrative notes, the team leader then discussed the definition of the new ICT process. Next, the Team Leader briefed the charter of the ICT and explained areas that needed further clarification. Upon completion of the charter brief, the Team Leader then introduced the support contractor that was tasked with the assessment of the current state of Directed-Energy technology.

The support contractor's briefing was on the initial technologies assessment of the threat, effects phenomena, current technologies and systems, and advantages and disadvantages of different types of Directed-Energy. At the conclusion of the support contractor's briefing, a risk assessment of the technological feasibility of different DE systems against a variety of targets was presented. The support contractor's brief enabled all of the members of the ICT to share a common understanding of the latest issues and feasibility of DE weapons.

After a mid-morning break, information was exchanged on several DE weapon system possibilities. The first exchange was delivered by a contractor that had a new and untested theoretical approach for a Directed-Energy weapon. The Air Defense Lab had previously seen this idea and had forwarded the idea to Government physicists for assessment of feasibility of the contractor's idea. The second exchange was delivered by a representative of the U.S. Army Infantry School, which has been working on a Directed-Energy Warfare Vehicle (DEW-V) since the early 1980's. He made a recommendation that the Air Defense School and the Infantry School work together closely in order to get a Directed-Energy weapon approved.

Following the information exchange on DE weapon possibilities, the Team Leader briefed the work ahead/milestones that the ICT would focus upon. The work ahead/milestones for the ICT included:

- Initial draft concept delivered - 23 OCT 96
- Initial draft rationale for MNS and ORD Delivered - 31 OCT 96

- Staff initial draft concept w/membership - 28 OCT-15 NOV 96
- Incorporate comments/provide final draft concept - 20 NOV 96
- Develop initial draft MNS - 22 NOV 96
- Staff draft MNS - 25 NOV - 6 DEC 96
- Conduct second ICT meeting/finalize MNS - 20 NOV 96
- Brief draft concept and MNS to TRADOC/DA - DEC 96
- Publish concept and MNS - JAN 97
- Start ORD work - JAN 97

After the work ahead/milestones were discussed, the ICT meeting was closed and the members were dismissed.

D. CURRENT TRADOC ICTs

At the time of this research (October 1996), the other TRADOC schools are embracing the ICT concept and formulating ICTs of their own. This section will list all of the current ongoing ICTs and their purpose. This list is intended to provide the reader with an idea of what types of concepts are currently being explored by ICTs within TRADOC schools.

1. Air Defense Center

Combined Arms Directed-Energy Weapon System (CADEWS)
Purpose: To do MNS, concept, ORD for CADEWS

2. Armor Center

Force XXI Battle Command Brigade and Below ICT (FBCB2 ICT)
Purpose: To determine concepts, requirements, and resources essential to managing the development of an enhanced comprehensive 21st Century Battle Command

Program that spans all DTLOMS.

Current Abrams Fleet ICT
Purpose: To replace the current M1 Abrams Tank Series 1-N list with a high payoff improvement strategy to sustain Abrams system overmatch until the fielding of the Future Combat System; tasks also focus on ammunition development.

Suite of Survivability Enhancement Systems ICT (SSES ICT)
Purpose: Determine operational requirements for and steward a Suite of Survivability Enhancement Systems for current fleet systems through Acquisition Milestone One.

Future Scout and Cavalry System ICT (FSCS ICT)
Purpose: Determine operational requirements for and steward the Future Scout and Cavalry System (FSCS) through Acquisition Milestone One.

Future Combat System Integrated Concept Team (FCS ICT)
Purpose: Determine operational requirements for and steward the Future Combat System (FCS) through Acquisition Milestone One.

3. Aviation Center

Survivable Armed Reconnaissance on the Digitized Battlefield
Purpose: Identify the combined effects and optimum mix of Comanche and Unmanned Aerial Vehicles (UAVs). Examine a broadened role for the Comanche in Joint operations linked to an integrated Intelligence Surveillance and Reconnaissance (ISR) environment and explore Joint ISR doctrine, training capability, and force packaging.

4. Combined Army Support Command (CASCOM)

Munitions Survivability ICT
Purpose: To support the insertion of proven and emerging technologies to enhance the survivability of critical munitions. The ICT's goal is twofold; establish a seamless team of professionals dedicated to munitions survivability and secondly, to execute a program that demonstrates technological enhancements in the areas of munitions material handling equipment (MHE), advanced barrier materials, automated information technology enhancements to ammunition supply areas; container and system interface improvements and strategic supply areas; container and system interface improvements and strategic configured load-enabling technologies. The underlying ICT philosophy is to insert technology quickly to benefit the soldier in the field.

Power Sources
Purpose: To address Combat Service Support issues related to power sources and accessories (batteries, solar devices, fuel cells, capacitors, fly wheels, chargers, tools, test equipment, etc..)

Combat Service Support Science and Technology
Purpose: To coordinate all Science and Technology (S&T) efforts within CASCOM. The goal is teamwork and to speak with one voice and avoid duplication among the Directorates. It will also provide a unified position for the CG, CASCOM during TRADOC S&T reviews, S&T Objective Reviews, and other senior-level forums.

5. Chemical Center

Theater Missile Defense 2 Lethality Study (Army Science Board)
Purpose: To coordinate the technology plan to address the future tactical missile threat.

Joint Chemical Agent Detector (JCAD) Joint Working Group
Purpose: to identify joint requirements for the next generation chemical agent detector system. This is a USAF-lead program.

Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)
Purpose: To formulate the joint requirements for a passive standoff chemical agent detector. This is an Army-lead program.

Joint Service Lightweight Nuclear, Biological and Chemical Reconnaissance System (JSLNBCRS) Joint Working Group
Purpose: To identify joint requirements for a lightweight NBC reconnaissance system. This is a USMC-lead program.

Nuclear, Biological and Chemical Joint Warning and Reporting Network (JWARN) Joint Working Group
Purpose: To identify the joint requirement and procedures for automating analysis, computation, and dissemination of warnings for NBC hazards, and integrating these capabilities into existing communications, command, control, computers, and information (C4I) systems. This is a USMC-lead program.

Joint Service Lightweight Integrated Suit Technology (JSLIST) Joint Working Group
Purpose: To identify and refine joint requirements for NBC protective garments and equipment. This is a USAF-lead program.

Joint Service Aircrew Mask (JSAM) Joint Working Group
Purpose: To identify joint requirements for an aviation/aircrew mask. This is a USN-lead program.

Joint Biological Remote Early Warning System (JBREWS) Joint Working Group
Purpose: To identify joint requirements for remote/standoff biological agent detection systems.

Doctrinal Review and Approval Group
Purpose: To review, revise, and/or approve proposed changes to NBC defense doctrine, tactics, techniques, and procedures.

Internal Task Force -29 (ITF-29)
Purpose: Combined Canadian, United Kingdom, and US Task Force to identify ideas on what nuclear, biological, and chemical (NBC) information will be required and how it should be handled within the areas of operation.

Army Warfighting Experiment (AWE) Working Group
Purpose: To address all Nuclear, Biological, and Chemical (NBC) defense, smoke/obscuration and field flame expedient issues in relation to doctrine, training, leadership, organization, materiel, and soldier (DTLOMS) for upcoming Army Warfighter Experiments.

6. Engineer Center

Army After Next
Purpose: To visualize and depict engineer operations in the Army After Next.

Armored Engineering
Purpose: To develop and engineer operations vision and future operational capabilities that will be required to support armored/mechanized forces.

Countermine
Purpose: Examine all aspects of the Army's countermine mission to identify required improvements to countermine capabilities.

Construction
Purpose: Not issued at this time.

Terrain Visualization
Purpose: To integrate terrain visualization into Army of the 21st century.

Unmanned Terrain Domination
Purpose: Develop the capability to gather battlespace data, evaluate the data, determine courses of action, and employ various tactics to achieve the objective — with or without the "man-in-the-loop".

Engineer Armaments and Munitions
Purpose: To be determined.

Engineer C4I
Purpose: To be determined.

Sapper
Purpose: To be determined.

7. Field Artillery Center

Weapons and Munitions Integrated Concept Team
Purpose: The Field Artillery has formally established the Weapons and Munitions Integrated Concept Team (ICT) for the purpose of examining related issues, concepts, and Future Operational Capabilities (FOCs) for all cannon or missile and rocket-type systems and munitions. The desired results of the ICT are team reports stating specific fixes or solutions to FOCs in the areas of doctrine, training, leader development, organizations, soldiers, and simulations. A Mission Need Statement (MNS) and/or Operational Readiness Document (ORD) will be required upon determination of materiel solutions.

Target Acquisition Integrated Concept Team
Purpose: The Field Artillery has formally established the Target Acquisition Integrated Concept Team (ICT) for the purpose of examining related issues, concepts, and Future Operational Capabilities (FOCs) for FA targets acquisition requirements. The desired results of the ICT are team reports stating specific fixes or solutions to FOCs in the areas of doctrine, training, leader development, organizations, soldiers, and simulations. A Mission Need Statement (MNS) and/or Operational Requirements Document (ORD) will be required upon determination of materiel solutions.

Command, Control, and Communications Integrated Concept Team
Purpose: The Field Artillery has formally established the Command, Control, and Communications (C3) Integrated Concept Team (ICT) for the purpose of examining related issues, concepts, and Future Operational Capabilities (FOCs) for all C3 type systems. The desired results of the ICT are team reports stating specific fixes or solutions to FOCs in the areas of doctrine, training, leader development, organizations, soldiers, and simulations. A Mission Need Statement (MNS) and/or

Operational Requirements Document (ORD) will be required upon determination of materiel solutions.

Combat Service Support Integrated Concept Team
Purpose: The Field Artillery has formally established the Combat Service Support Integrated Concept Team (ICT) for the purpose of examining related issues, concepts, and Future Operational Capabilities (FOCs) in the area of combat service support for Field Artillery organizations/systems. The desired results of the ICT are team reports stating specific fixes or solutions to FOCs in the areas of doctrine, training, leader development, organizations, soldiers, and simulations. A Mission Need Statement (MNS) and/or Operational Requirements Document (ORD) will be required upon determination of materiel solutions.

8. Infantry Center

Future Infantry Vehicle
Purpose: Support MNS staffing and ORD development

9. Intelligence Center

Battlefield Visualization
Purpose: To examine, test, and document Battlefield Visualization future operational capabilities in support of Force XXI and the Army After Next.

Counterintelligence/Human Intelligence
Purpose: To determine future operational capabilities and DTLOMS implications based on operational concepts Force XXI and Intel XXI.

Aerial Common Sensor
Purpose: To determine Aerial Common Sensor future operational capabilities in support of Force XXI, Intel XXI, and the Army After Next.

Science and Technology
Purpose: To pursue emerging technologies which significantly impact the implementation of Intel XXI and our capability to address future operational capabilities for the Army After Next.

Signals Intelligence Support to Tactical Operations
Purpose: To determine tactical signals intelligence future operational capabilities in support of Force XXI.

Intelligence Support to Information Operations
Purpose: To refine the concept of Intelligence Support to Information Operations and

develop an IO action plan incorporating lessons learned and their implications across DTLOMS.

10. Signal Center

Warfighter's Information Network
Purpose: Warfighter Information Network, WIN, is the Army's proposed operational concept for integrating foxhole to sustaining base communications and information services that support Force XXI requirements well into the 21st Century. WIN is a culmination of supporting concepts, numerous experiments, and insights gained from past experiences and efforts by the Signal Center. This ICT develops the major components and attributes of WIN concept, determines how WIN will support the overarching Force XXI concept (TRADOC Pam 525-5), provide strategy for WIN developments necessary to achieve the objective WIN architecture, and assesses the impact that WIN has on each DTLOM area. Additionally, the WIN ICT effort integrates its work and products into the future architecture of DOD as defined in the WIN Master Plan.

E. SUMMARY

This chapter provides an overview of how the DCD at the Air Defense Center approached the challenge of conducting their first Integrated Concept Team. They quickly assessed the current DoD environment of increased teaming throughout the acquisition process and applied teaming principles to develop concepts and requirements for a technologically superior weapon system for the 21st century. Although the new requirements determination and ICT process have been in use for less than one year, TRADOC organizations are embracing the process, as can be seen by the number and diversity of ongoing ICTs. The ICT methodology helps leaders make better and *faster* decisions by the synergistic efforts of an empowered, multi-disciplinary team of dedicated people. The next chapter will provide an analysis of the challenges that ICT leaders face when they initiate ICTs in their workplace.

V. ANALYSIS OF INTEGRATED CONCEPT TEAM IMPLEMENTATION CHALLENGES

A. INTRODUCTION

This chapter provides an analysis of the challenges that DCD-level ICT leaders face when they initiate ICTs in their workplace. The focus of this chapter is on the issues that impact the development, acceptance, and utilization of ICTs at the DCD level. These issues came from ICT documents, personal interviews with ICT personnel, and the researcher's own observation of ICTs in progress.

Previous chapters presented general overviews of Requirements Determination, the ICT process, and a look at how the Air Defense School conducted their first ICT. This chapter will provide an analysis of specific challenges and issues that face all Integrated Concept Teams within TRADOC.

B. KEY INTEGRATED CONCEPT TEAM CHALLENGES

The TRADOC Requirements Determination process that was promulgated within the past year, is described by TRADOC as a "new way of doing business." Along with this "new way of doing business," comes major cultural and procedural changes for the combat development community. The ICT is the backbone of the new Requirements Determination process, but procedural information on how to conduct ICTs still has not been issued by TRADOC. This lack of information from TRADOC has caused DCDs to start conducting what they feel are ICTs, but they are uncertain if they are doing them correctly. All combat developers surveyed felt that they shared similar growing pains as they progress throughout

their initial ICTs. For the purposes of this thesis the following major challenges will be discussed:

- Cultural Change
- Time Pressure from TRADOC
- Institutionalism of the ICT Process
- Resource-Constrained Environment
- Technology Base
- Team Building

C. ANALYSIS OF KEY INTEGRATED CONCEPT TEAM CHALLENGES

1. Cultural Change

The Army previously determined requirements based on deficiencies identified between our capabilities and those of the Soviet Union or Warsaw Pact. The process was largely paper-based and done in relative isolation from other user representatives - Joint and Army - and "solution" developers. (RDBB, 1996) Now requirements are determined based on Joint and Army *capabilities* rather than known deficiencies. This difference in how DCDs determine requirements combined with using ICTs, has caused a cultural change to which combat developers are still adjusting. The entire idea of "teaming," in the context of using IPPD as a management technique, was not universally accepted as recently as two years ago. The Perry memo that prescribed the use of IPPD and IPTs in DOD Acquisition was issued in May 1995. The material development community rapidly integrated IPPD with their Integrated Product Teams, and these teams soon left the requirement development communities behind. The Army TRADOC sought to "kick-start" the teaming process

within their combat developers by issuing the Requirements Determination "Black Book." The "Black Book" did have the effect that TRADOC desired, in that all DCDs in the Army have now initiated ICTs within their organization, and are using them in their requirements determination process.

2. Time Pressure

When TRADOC issued their Requirements Determination "Black Book" in May 1996, most DCDs were surprised to read about the new Requirements Determination Process and the use of ICTs within this process. They were told to start using the new process immediately and use ICTs to determine requirements. What TRADOC neglected to publish was a "how to" guide for conducting ICTs. Most combat developers were familiar with the IPT process, and many were serving members on IPTs, but no one knew exactly what an ICT was, or how to conduct one. During the summer of 1996, TRADOC conducted a "road show" series of briefings to all of the TRADOC schools. This "road show" elaborated the issues and ideas contained in the Requirements Determination "Black Book." The "road show" briefers defined what ICTs are, and that this was the new process that DCDs would use, but no mention was given on "how" the process should be conducted. Contained within the "Black Book" were two letters— one from the Chief of Staff of the U.S. Army, General Dennis J. Reimer, and the other from the TRADOC Commanding General, William W. Hartzog. Both of these four-star Generals asserted that to support the Army of the 21st century, we must speed up the Requirements Determination Process so that we can achieve the warfighting capabilities that our soldiers deserve. Additionally, General

Hartzog's letter, stated that:

> Most of our requirements determination regulations and policies are out of date and do not reflect our new way of doing business. They will be revised or eliminated in 1996. Until then, this pamphlet provides an introductory overview of the way warfighting requirements will be determined, documented, and approved. (RDBB, 1996)

The key words in this statement are, "until then." The slim (20 page) pamphlet mentions the use of ICTs throughout the document, but does not list a reference anywhere concerning how to conduct ICTs. In fact, there were no references available anywhere that DCDs could use to initiate their first ICTs. At the time of this writing (November 1996), TRADOC has still not issued any references that combat developers can use to develop and refine their ICTs. When TRADOC headquarters was queried about sample team charters or ICT templates, the answer was that numerous things were in progress and would be issued shortly. Until TRADOC issues some guidance or training materials, DCDs will be forced to work through the challenges of ICT implementation by themselves.

3. Institutionalism of the ICT Process

The acquisition community has accepted and used IPTs for about two years now. The combat developments community is about a year behind in their teaming thought process. Although some combat developers are also members of program-level IPTs, and have IPT experience, many interviewees were new to the concept of teaming. Most have worked in some form of working groups similar to ICTs, but they did not have a model or example of an ICT they could use to start from. Every person that was interviewed felt that the concept of teaming was an excellent idea and that it would greatly assist the requirements determination process. Their concerns were that without some form of

guidance from TRADOC, they would be "spinning their wheels" and not really accomplishing anything new or revolutionary. TRADOC has issued a challenge and told their combat developers to use ICTs in the requirements determination process - their challenge now is to support these combat developers, and quickly issue some guidance and training materials that will make this process become "institutionalized."

The change to using ICTs, like any other major change, will take time for growth and acceptance. Growing pains are being felt by all DCDs, but what should be refreshing for TRADOC is that all DCDs are embracing the use of ICTs and are making great strides to make them effective.

4. Resource-Constrained Environment

Currently most DCDs have experienced tremendous down-sizing with their civilian personnel. This, combined with shrinking budgets, makes starting any "new way of doing business" more difficult. Training programs become unaffordable, and letting personnel go to these programs causes other work not to be accomplished. Personnel are told to read about ICTs on their own time and figure out how to make them work. Many personnel are becoming involved with more and more ICTs and IPTs. The requirement to physically be at all of these teams is becoming increasingly more difficult. The cost to the DCD, not only in travel funds, but also in travel time, is becoming more and more burdensome. One individual interviewed mentioned that some personnel are getting "burned out" because of all of the travel involved with different teams. The high cost of travel and the large amount of time involved, gives more credence to the argument for increasing the amount of electronic support to ICTs.

5. Technology Base

Technological innovations constantly influence the requirements process and almost every ICT is set up to investigate the latest in technological advancements and apply these new technologies to a set of concepts that the team will develop. The challenge for DCDs is to get the best information they can about new technologies, and to get this information for "free." Numerous Government agencies have conducted research and are willing to share this research with the ICT. The Army Science and Technology (S&T) program is a resource that can be tapped for many innovative technological insights. Numerous S&T projects are funded by the Army and these projects should be linked closely with ongoing ICTs. Science and Technology projects not only advance technology, but they also assist ICTs to better understand the "art of the possible" and refine many of the requirements associated with them. It is a smart idea for combat developers to research as fully as possible all of the S&T projects that have been conducted that might impact their ICT. In today's financially-constrained environment, it does not make sense to acquire or conduct research that might already be ongoing or previously accomplished.

6. Team-Building

In order to get the maximum participation of all members of the ICT, there has to be a team-building process. This is a time-consuming process that many ICT members do not feel is necessary, but the small amount of time spent in team-building will pay off in the quality of interaction, and better expression of individual's ideas. Team-building can be a formal process which uses training materials and video-tapes, or can be more informal. Informal team-building starts during introductory sessions with all of the ICT participants.

Often the best team-building occurs during informal sessions such as working lunches, breaks in the ICT session, and ice-breakers for team participants. Whatever methods or combinations of methods are used, the key point is to ensure that all members feel free to participate and not be afraid to put forth creative thoughts. This is even more critical for ICTs than IPTs, because *concept* teams must maximize their creativity in order to develop warfighting and material concepts that are off into the future.

Team-building processes enable personnel of all personality types to work together better. For example, personalities of team members often inhibit the way the team interacts, and these personalities can slow or stifle the ICT process. Extroverted people may tend to dominate the discussion and lead the group to areas that may not be in the group's best interest. On the other hand, introverted personnel may be too self-conscious to express their feelings, relay important information, or share good ideas. Often during breaks in an ICT meeting, the researcher witnessed small discussions between two to three ICT members taking place. During these discussions, many excellent ideas were shared between the small group. The smaller group obviously felt comfortable with discussion with fewer members, but were not able to share the same comfort in an ICT with many other personnel in the room. Better team-building will allow all members to understand that ideas need to be exchanged within the team, and that free information exchange is in the best interest of the team.

D. SUMMARY

This chapter highlighted the challenges that DCD-level ICT leaders face when they initiate ICTs in their workplace. These challenges are not difficult to overcome, but require

time and energy to resolve. Team training and team-building programs are the key tools that ICT leaders can use to give their teams a "jump-start." Individuals are becoming members of ICTs and IPTs more and more frequently. The institutional knowledge of teaming will eventually become second nature and gain better acceptance. Until then, ICT personnel will continue to experience the "growing pains" of this cultural and procedural change.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

It has only been a little more than one year, since Secretary of Defense William J. Perry signed a directive to implement a "fundamental change in the way DoD acquires goods and services," by using IPPD concepts and IPTs. Considering the short length of time since his directive to use IPPD, DoD has made some remarkable strides in their acceptance and use of teaming techniques. This "fundamental change" affects every area in our defense acquisition culture. Traditionally, the culture of the DoD acquisition community has grown to be risk-adverse. The implementation of IPPD allows the acquisition community to overcome the risk-adverse culture by developing trust and teamwork. Oversight and review of programs is simplified and decreased by the inclusion of all participants within the IPT process. Historically-adversarial relationships are transformed when headquarters, staff organizations, and programs are brought together into productive partnerships.

The material development community has taken an early lead by implementing IPPD. Program Managers have been successfully using IPTs and are enjoying the benefits of better relationships, reduced cost, and less oversight.

The Concept Development community is now on board and has embraced IPPD and used IPPD tenets to formulate and use ICTs. These ICTs are multi-disciplinary teams that are able to look at a concept from many different perspectives. The diversity and experience of the multi-disciplinary teams shortens the requirements determination "event" and provides it a better early focus. The ICT complements the existing IPT methodology used

by material developers to manage system development. Formation of ICTs early in concept development enables the team to transition to an IPT when a material requirement is approved at Milestone I. The ability of ICTs to transform into program-level IPTs, will ensure continuity is maintained from concept to fielding, when a material solution is recommended. ICTs can be used for more than determining material requirements. Changes in doctrine, training, leader development, and organizations can also come from ICT recommendations.

B. RECOMMENDATIONS

Based on the lessons-learned and information gathered from research, interviews, and personal observation of ICTs in progress, the author has several recommendations for combat developers intent on initiating ICTs in their organizations.

First, personnel involved in ICTs must understand that an ICT is not"just another meeting", but a radical departure from the old way of doing business. You can't put a group of people together in a room and merely tell them that they are a now an ICT. The best way to get this point across to team members, is to conduct training on the ICT process and focus on team-building. Training is important so that members are prepared for the dynamics of the ICT process. Each ICT is different and requires different types of training to get the team oriented to the business at hand. Currently, there are training packages and training video tapes for Overarching (OIPT) and Working-Level Integrated Product Teams (WIPT), but there are no training materials as yet for ICTs. TRADOC is currently working on guidelines and procedures to assist combat developers with their ICTs. By using innovative training techniques and team-building procedures, individuals will be able to

more quickly understand the process, feel like a team "member" and not a bystander, and be able to make significant contributions to "their" ICT.

Communication is key to the success of the ICT process. The whole intent of IPPD is to improve the communication flow across organizational boundaries. ICTs that work well promote near-instantaneous communication among personnel at all levels of an organization without regard to the chain-of-command. (GMOIPT, 1996) Rapid information dissemination requires the use of all assets available to the ICT. Electronic means such as e-mail, File Transfer Protocol (FTP), and Electronic Data Exchange (EDE) allow information to be disseminated to the ICT rapidly and at low cost. Video tele-conferencing is useful for small groups, but because of the large size and diversity of most ICTs, this means is often impractical.

Communication must not only occur between team members, but also between team members and their chain of command. For empowerment to work, team members must keep their superiors appraised of what the team is doing. Concurrently, superiors must keep their team members informed of their intent, and trust their subordinates to represent that intent within the ICT.

Finally, there is a temptation to use ICTs and IPPD for every task. Some tasks are better performed in a functional organization, or by one responsible individual. An ICT is not needed for urgent, minor, or routine matters. During an interview with one individual, he stated that he was a member of seven different IPTs and ICTs. He could not be expected to attend every one of these teams and still perform his regular duties. ICTs that are run efficiently and have excellent communication between team members, can help eliminate

the problem of spreading personnel resources too thin.

C. ANSWER TO RESEARCH QUESTIONS

1. How should Integrated Concept Teams be best utilized in the Requirements Determination Process?

The Chief of Staff of the U.S. Army, has directed that TRADOC discipline the requirements determination process by being the Army's requirements "gatekeeper." TRADOC has taken this direction and quickly published a new guide called the Requirements Determination Black Book. This guide, as well as the new AR 71-9, has explained that TRADOC will use integrated concept teams — multidisciplinary teams from throughout the Army, industry, and academia to determine DTLOMS requirements. The up-front and early use of ICTs will enable requirements developers to achieve quicker results and ease the transition to a material solution.

2. Who are the key members of the ICT process and what will their roles be in the ICT?

The key members of the ICT process include the chairman, team leader, and principal members. The chairman has the authority to assemble a team of subject matter experts, task team members, and to resolve discrepancies. The team leader serves as a functional supervisor with the duties of keeping the team focused. Team leaders must be able to have excellent communication and leadership skills in order to be effective. Principal members are the "work horses" of the ICT. They represent many different organizations and agencies. Each principal member is a specialist and has a key role on the team as a subject matter expert.

3. How should the Combat Developments Organization of the U.S. Army Air Defense School best organize to facilitate implementing the ICT concept in the new Requirements Determination Process?

At the start of this research, this author thought that this would be the focus of this thesis. But the answer to this question is that no reorganization is required to support the requirements determination process. The whole philosophy behind the use of ICTs is to draw subject matter experts together in a team environment to determine requirements. The diversity of members from DCD and many other organizations does not allow them to be permanently co-located, or require reorganization.

D. RECOMMENDATIONS FOR FURTHER STUDY

1. Transition of an ICT to an IPT

Investigate the process of the transition of a concept-based integrated concept team into a material-based integrated program team at a Milestone I decision. Determine which individuals would remain with the team, and which individuals should drop out of the team. Currently within the Army, because the ICT concept is so new, no ICT concepts have progressed into a material solution.

2. Electronic Resources to Facilitate ICTs

Examine all of the latest computer technologies and video tele-conferencing options that are available to facilitate meetings. Determine if cost-savings could be realized by the use of electronic means versus the expense and time involved with travel to central locations. Investigate the use of the Internet as a tool in which concepts and information could be shared among team members.

3. ICT Team-Building

Research and develop a program that team leaders could use to get their teams trained on IPPD and their roles as team members. Explore options such as videotaping successful ICTs. List and explain examples of desired and undesired IPPD team behavior.

APPENDIX -- ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
ASTMG	Army Science and Technology Working Group
ASTMP	Army Science and Technology Master Plan
AWE	Advanced Warfighting Experiment
CADEWS	Combined Arms Directed-Energy Weapon System
CAIV	Cost as an Independent Variable
COTS	Commercial Off the Shelf
DA	Department of the Army
DCD	Directorate of Combat Developments
DCDCD	Deputy Chief of Staff for Combat Developments
DE	Directed-Energy
DoD	Department of Defense
DTLOMS	Doctrine, Training, Leader Development, Organization, Material, Soldier
EDE	Electronic Data Exchange
FOC	Future Operational Capability
FTP	File Transfer Protocol
ICT	Integrated Concept Team
IPPD	Integrated Product and Process Development
IPPM	Integrated Product and Process Management
IPT	Integrated Process Team
MNS	Mission Needs Statement
NDI	Non-Developmental Item
OCR	Operational Capability Requirements
OIPT	Overarching Integrated Product Team
ORD	Operational Requirements Document
PM	Program Manager
RFP	Request for Proposal

S&T	Science and Technology
SSDC	Space and Strategic Defense Command
STO	Science and Technology Objectives
TRAC	TRADOC Analysis Center
TRADOC	U.S. Army Training and Doctrine Command
USAADASCH	U.S. Army Air Defense School
WIPT	Working Integrated Product Team

LIST OF REFERENCES

Cochrane, Charles B., "Defense Acquisition Policy- A More Flexible Management Approach," PM Magazine, July-August 1996, pp. 16-21.

Center for Naval Analyses, Getting the Most Out of Integrated Product Teams (IPTs), Alexandria, VA, May 1996, pp. 48-50.

Czelusniak, Daniel P., "Navy PEO Delivers Remarks to Navy League Panel on Acquisition Reform &Progress," PM Magazine, September-October 1996.

Defense Acquisition Deskbook Joint Program Office, Deskbook CD-ROM, September 1996.

Department of the Army, Army Regulation 71-9, Force Development Material Requirements (Draft), June 1996.

Department of Defense, DoD Guide to Integrated Product and Process Development, 5 February 1996.

DiTrapani, Anthony R., Getting the Most Out of Integrated Product Teams (IPTs), Center for Naval Analysis, Alexandria, Virginia, May 1996.

Grimes, Vincent P., "Redesigning the Institutional Army Means Radical Changes," National Defense, April 1996.

Grimes, Vincent P., "Integrated Concept Groups Develop Requirements to Launch Army Acquisition Efforts on Right Path," National Defense, April 1996, pp.16-17.

Naylor, Sean D., "U.S. Army Planners Craft Future Combat," Defense News, July 1996, pp. 32.

Office of the Under Secretary of Defense for Acquisition Reform, OIPT-WIPT Information Guide, March 1996.

Parker, Glenn., Team Players and Teamwork: The New Competitive Business Strategy, University Associates, 1992.

Perry, William J., "Memorandum, Subject: Use of Integrated Product and Process Development and Integrated Product Teams in DoD Acquisition," Washington, D.C., 10 May 1995.

Preston, Colleen A., Institutionalizing IPTs in Defense Acquisition: The DoD's Commitment to Change, Contract Management, September 1995.

Resnick, Al, Briefing, "Requirements Determination Pamphlet: An Information Briefing about the "New Way of Doing Business," Office of Deputy Chief of Staff for Combat Developments, HQ, TRADOC, 12 July 1996.

Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-66, Operational Capability Requirements, December 1995.

Training and Doctrine Command (TRADOC), "Black Book," Requirements Determination, May 1996.

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